

The Macdonald Journal

SEPTEMBER 1979



Quebec Farmers' Association
1979
Annual Meeting



Special Invitation
QFA Members

DATE:

Wednesday, November 7, 1979

TIME:

10:00 a.m. to 4:00 p.m.

PLACE:

CENTENNIAL CENTRE
MACDONALD COLLEGE

Guest Speaker:

W. Dobson Lea

President

Canadian Federation of Agriculture

The Macdonald Journal

SEPTEMBER 1979

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In This Issue

Cover: At the Emile A. Lods Agronomy Research Centre, Dr. Harold Klinck (second from left) is shown selecting desirable plants in the barley breeding program. For article, see page 6.

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Journal Jottings

Despite our efforts through individual articles and the Macdonald Reports section, a Macdonald graduate and Journal reader, who was attending a meeting here on Campus recently, asked, "What's new in research at Macdonald? I need to know more — so does the farm community." As far as two Departments, Animal Science and Plant Science, are concerned, I hope that this issue offers a partial answer to the question. Two articles take a general look at some of the research underway at the present time. For specifics, we hope in future issues to go into more details on the progress and results in particular areas, and may we suggest that if there is an area that interests

you, then request further information, either by writing to the Journal or to the Department concerned. In these two Departments alone, I was impressed by the amount of work being done, and may I point out that as far as the Department of Plant Science is concerned, we are only discussing the projects conducted at the Emile A. Lods Agronomy Research Centre. We were interested, in this instance, in the Centre itself, and it is used mainly by the Agronomy Section.

The QWI pages in this and the next couple of issues will be largely devoted to reports on the Federal Women's Institutes of Canada's 8th Triennial Convention which was held

in Saskatoon. There is a wealth of information to be read at home and, for QWI members, to be acted upon at up-coming meetings. Mrs. Ruth von Brentani is the new Provincial Publicity Convener and the fifth Convener with whom I have worked. Hilda Graham, Jean Clark, Anne Robertson, Gladys Nugent — each has been different, each enjoyable, and each, I feel, has become a friend. I look forward to working with Mrs. von Brentani and I know that all branches and counties, indeed all members, will support her in sending in the best in QWI publicity.

Hazel M. Clarke

James Houston

How do you honour a lifetime of living a job which is continuing even after retirement?

For some 43 years Mr. James Houston, better known as Jimmy, spent his working and living hours across the tracks from the Campus on one of the few remaining farms on Montreal Island. His years of association with Macdonald College are debatable. For the computer at McGill University, it is 43 1/2 years. For some others, it is more like 50 years as he was pulling mustard at the age of 15 for something like 25 cents a day. For still others, it is closer to 65 years, remembering the times he was following his dad around the barns "assisting" with important research projects.

Every possible farm task was performed by Jimmy at one time or another. He was a teamster ploughing the fields, a cowman staying up nights waiting for a calf to be born or tending a sick cow. He was in charge of the Dairy Herd, developing it into one of the best herds in the province, and he eventually took over from his father as Manager of the Farm.

His particular contributions to Macdonald College, however, are in the field of public relations and his concern for the many students who had the good fortune to get to know him. His infectious laugh, while sitting on a bale of straw teaching a student how to make a halter, carried cheerfulness throughout the barn. There is hardly a Royal Winter Fair that Jimmy has not attended. There are few calf club members within a radius of 150 miles of Macdonald College who have not been placed in the show ring at one time or another by Jimmy Houston.

Whenever the words Macdonald College are mentioned, someone will inevitably ask, "and how is good old Jimmy?". Well, he is "retired," coming to his new office at the back of the Farm Centre every day and, of course, giving me some welcome advice as he goes by my office.

Jimmy, we wish you and Polly a long and happy retirement job around the College.

Rudi Dallenbach,
Farm Director.

R. J. (Bob) Watson

An attempt to write a tribute on the occasion of the retirement of someone who has completed a 31-year career of devoted service gives rise to feelings of inadequacy. When that person is someone whose advice, cooperation, and general all round dedication have been of inestimable value to the writer for many years, the exercise generates acute mixed emotions — of admiration and regret.

Bob Watson was in on the "forest" floor so to speak in the development of the Morgan Arboretum. He played a major part from the very early years in the many and difficult tasks which, in time, culminated in the unique forest which exists today. Not only did he work hard and long but he worked with intelligence, an open mind, and an almost fanatical interest in his work. Throughout his career the short-range projects and problems never obscured his long-range vision of the Arboretum and Woodlands. The primordial belief that he was creating his own monument fueled his enthusiasm which never wavered.

The nature of the work was such that as Foreman of the Morgan Arboretum he was indeed to the fore in making contacts with the public. This he did in his own special way, on an almost daily basis, with most excellent results. As a representative of the Faculty and the University he deserves full marks.

As has been pointed out by others, Bob Watson was an unusually versatile person. His principal responsibilities demanded many skills. But he went beyond the normal call of duty, becoming involved in teaching in the Extension Program of evening courses and in coaching the Macdonald College Woodsmen.

In short, Bob Watson was *un homme engagé*. He went all out all the time and it seemed at least that everything he did in his 31 years was a labour of love. It is fine to recognize the work of any good and faithful servant. But it is particularly fine when that person's efforts permit him to look back on his life and see that they have, in fact, yielded an enviable monument in his honour.

The results of his work will exist in the Morgan Arboretum in tangible form indefinitely. They will also long remain in the minds of the many who have known him.

To Bob Watson then, I think, I have the mandate of the Macdonald family to say that we salute you, we thank you, we will miss you, and we wish you well. What we will not say is good-bye, because we know full well that a good Clansman always heeds the call to gatherings.

J. D. MacArthur,
Curator, Morgan Arboretum.

Department of Animal Science

LIVESTOCK RESEARCH

by H. Garino and Staff
Department of Animal Science

Introduction

The Department of Animal Science and the Dairy Herd Analysis Service maintain an active program of research in the fields of Genetics, Nutrition, and Physiology. The majority of the most recent and ongoing projects in this program are of an applied nature and have as a common goal to assist in the development of the livestock and poultry industries.

The purpose of this article is to either introduce or update MacDonald Journal readers as to the type of work our staff members have singled out as their research priorities and as to how the livestock and poultry industries may benefit from the findings. The projects herein described have been grouped under the major species with which we work for ease of identification. For further information on a specific study the names of the staff involved in the project are included.

BEEF CATTLE

Beef Production as a by-product of the Quebec Dairy Industry — Although only a small fraction of the beef consumed in Quebec originates in the province, large numbers of male calves derived from dairy herds are not effectively utilized. This project aims to demonstrate that high quality beef can be produced economically from dairy calves of superior sires mainly on forage rations. **E. Donefer, L. Latrille, B. Kennedy, and H. Garino.**

The Effect of Rumensin on the Performance of Cattle of Different Breeds — The most common breeds of cattle available in Quebec for beef production are Herefords and Holsteins and the crosses between them (Black White Face) and between Hereford and Charolais. The performance of these breeds in terms of growth, feed intake, carcass quality and gross returns, as well as their response to the feed additive Rumensin was the purpose of this study. **H. Garino, B. Kennedy, and L. Latrille.**



DAIRY CATTLE

Dairy Herd Analysis Service

The DHAS research is centred round the genetic evaluation of sires and cows for milk production and auxiliary traits. The specific auxiliary traits under study are reproduction, outcome of pregnancy (calf size, calving ease and calf survival), somatic cell counts, milking speed and milk composition. This research includes optimum procedures to measure these traits and to estimate the effects of environmental and physiological factors on these traits.

This research is directed toward enhancing evaluation of sires used in artificial insemination units, indicating the selection and environmental conditions which will optimize dairy herd yield and provide research data which might aid in providing a more equitable reward to dairymen producing high quality milk.

Genetic Parameters and Environment Effects of Bovine Milk Protein Components — A milk analysis research unit adjacent to the DHAS milk analysis laboratory is in the process of being established. The research will be directed towards the problem relating to milk quality.

As an initial project, it is proposed to examine the relative importance of nutrition (type of forage, quality of forage, forage-concentrate ratio, total energy intake), environment (region, season, herd), physiology (stage of lactation, age of animal), udder health (somatic cell count), and genotype of milk protein and milk protein composition.

The purpose of this research would be to establish the population parameters of milk protein composition. The joint estimates of the effects of the above factors on protein composition are essential in order to study the economics of altering milk protein composition and content.

This initial research will provide guidelines to the direction of future research, which would attempt to measure the consequences of changes in milk protein to product quality and yield. The consequences of total protein versus selection for protein components would also be considered. **J. Moxley, B. Kennedy, and K. F. Ng Kwai Hang.**

Ketosis — This is a metabolic disease common in high producing dairy cows. The estimated loss to the Quebec dairy industry is \$15 million/year. While the present theory concerning Ketosis indicates a disorder in carbohydrate metabolism, other theories also suggest that a disorder in fat metabolism may exist. Furthermore, there might be a link between postpartum reproductive status of the dairy cow and incidence of Ketosis. The latter theory is at present being investigated at Macdonald College. **B. Laarveld.**

Evaluation of a low glucosinolate rapeseed meal as a protein supplement for dairy cows —

Although rapeseed meal is a cheap, Canadian source of feed protein, anti-thyroid substances (glucosinolates) have limited its use. New low glucosinolate varieties have been developed and were shown to be equal to soybean meal in promoting lactational performance, while thyroid function does not appear to be affected. Present research at Macdonald College involves the nutritional evaluation of low glucosinolate rapeseed meal in Quebec conditions. **B. Laarveld.**

The effects of trace mineral nutrition on reproductive performance in dairy cows —

Poor dietary trace mineral intake may result in poor reproductive performance in dairy herds. Long calving intervals, irregular heats, poor conception and abortions can result, at least in part, from sub-clinical deficiencies of trace minerals. Many mineral deficiencies can be detected by blood and milk analysis. A study is being conducted in which a large number of Quebec dairy herds will be visited to determine the adequacy of their mineral nutrition. Feed samples will be taken to determine levels of dietary intake and bulk tank milk samples and random blood samples will be taken to determine herd deficiencies. This study will lead to a better understanding of trace mineral nutrition and, hopefully, with it, improved reproductive performance in dairy cattle. **B. Laarveld.**

The role of prolactin in mammary gland metabolism — The food energy of the lactating cow is used for both the production of milk and the maintenance of normal bodily

functions. The hormone prolactin is involved in the initiation of lactation and it is suspected that high levels of the hormone may enable the animal to use more food energy for milk production due to a stimulation of the mammary gland. The hormone does not increase milk production, but cows with high levels of prolactin may produce milk more economically. The current experiments involve raising prolactin levels in cows and monitoring changes in the mammary gland via blood and milk samples. If the experiments are successful, tests could be developed to screen replacement heifers for prolactin levels and the low level ones could be culled as yearlings. **B. Laarveld.**

Follicular development and ovulation in cattle —

In attempting to superovulate heifers or cows to conduct embryo transfers, it was found that response to hormone treatments was quite variable within and between animals. As a consequence, research is being conducted to characterize the types of follicles which develop and those which regress. This work will improve our understanding of the estrous cycle and ovulation, and may have application in hormonally induced twinning and perhaps the induction of earlier fertile heats in postpartum cows. **B. Downey.**



POULTRY

Factors affecting the fertility and hatchability of turkey eggs —

This research is being carried out in conjunction with the Station de Recherche at Deschambault, Quebec. At Deschambault, work is being done on the selection of turkey hens for egg production when housed in

cages. At Macdonald, work is concentrated on the nutritional requirements of turkey hens housed in cages and on the effects of calcium and phosphorus levels on egg production, egg shell strength, and per cent hatch of fertile eggs. With respect to the male, research is being done on the effect of frequency of ejaculation on fertility, hatchability, and sperm production. Next year, this work will continue to examine the interaction between number of sperm per insemination and insemination frequency. This work is directed toward solving the severe problem of hatchability of eggs set by the turkey industry where only approximately 60 to 65 per cent of all eggs set hatch. **R. B. Buckland.**

Factors affecting the fertility of frozen chicken semen —

Until recently, efforts to freeze chicken semen have been relatively unsuccessful. Even now, with some degree of success being obtained, the resulting levels of fertility are not comparable with those obtained with frozen bull semen. If poultry semen could be frozen, wider use of superior males could be made, perhaps with the eventual establishment of stud centres. In addition, it would aid in the international trade of genetic material and allow for poultry lines, which may not be useful today but may be of use in the future, to be kept by freezing the semen. Semen could then be thawed out in the future and these lines incorporated into breeding programs. In addition, our work is directed toward a study of spermatozoa membrane structure and function as it relates to post-freezing survival of the spermatozoa. **R. B. Buckland.**

Modification of egg lipids —

This project aims at reducing egg cholesterol to accommodate hyperlipidemic patients who must minimize their dietary cholesterol. To date modest reductions in egg cholesterol have been attained through a dietary drug and through genetic selection in Leghorn chickens. **S. P. Touchburn, R. B. Buckland, and C. W. Chan.**

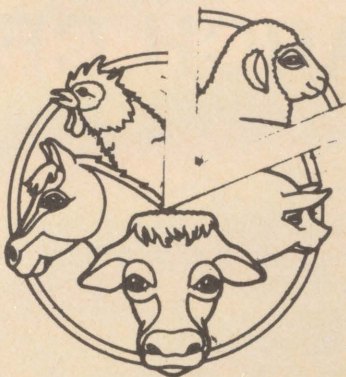
Level and form of dietary calcium supplement for turkey breeder hens in cages — The optimal level of dietary calcium for broiler breeder hens in cages needs further study. Results indicate that 2.25 per cent calcium, but with a major portion of the calcium provided in the form of oyster shell flakes, yielded the thickest egg shell and the highest level of hatchability. **S. P. Touchburn, C. W. Chan, and R. B. Buckland.**

Physiological mechanisms controlling ovulation and reproduction in domestic birds — The inherent physiological mechanisms that control ovulation and reproduction in domestic birds are currently being investigated. Although these studies seem far-fetched from practical agriculture, they benefit poultry production by yielding better management practices of the flocks (e.g., better use of the daily light and dark cycles) by opening new parameters for genetic selection, etc. **Paul C. Laguë.**

Possible utilizations of microwave irradiation in poultry production — Microwaves have found practical applications in communications as well as in the modern kitchen. However, their use is not without hazards to the human. Hence, the concern for people's health living in the vicinity of transmission towers and for safe microwave ovens. Some studies on domestic birds have indicated that microwave irradiation may be beneficial in poultry production. Experiments are being conducted on broilers and on pullets to evaluate the effects of low power microwave irradiation on production. **Paul C. Laguë.**

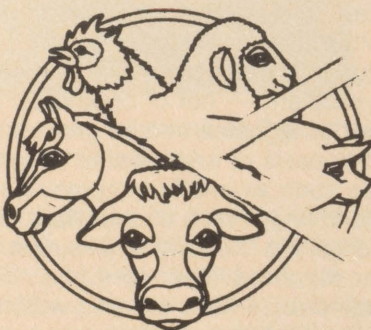
Studies of various daily light-dark cycles on egg production — With the increasing costs of electricity and feed, it becomes imperative to reduce the energy consumed by hens during their laying period. Experiments are being conducted to study what might be the minimal period of illumination necessary for optimal egg production and to determine whether some light regimens can prolong the period of usefulness of the hen's laying life. An increment in this parameter would extend the depreciation of the hens over a larger number of eggs produced. Preliminary results, for example,

show that two daily periods of two hours of light are as good as the regular practice of 14 to 16 hours of light/day. **Paul C. Laguë.**



SHEEP

Nutritive value of rations fed to sheep containing different levels of processed aspen wood and straw — Low quality roughages such as wood and straw are plentiful but characterized by low feeding values. Processes aimed at improving the digestibility of these materials have been known for quite some time; however, the economic implications of using these processed materials have to be worked out. This project attempts to evaluate rations containing optimally treated materials (high temperature and pressure) by digestibility, intake, and production responses. **E. Donefer, H. Garino, and G. Dhinsa.**



SWINE

Induction of farrowing in sows — Prostaglandins (both naturally occurring and synthetic) will destroy the corpus luteum of pregnant sows after a single injection. Research at Macdonald has shown that administration of one of these compounds on Days 111, 112, or 113 of gestation will result in farrowing within 24-30 hours. Sows and gilts on the Macdonald farm are routinely injected at 6:00 A.M. on week-days so that few litters are farrowed during the night or on weekends. One

or more products for this purpose should soon be available through your veterinarian. **B. Downey.**

Factors controlling ovulation in gilts — The prepuberal gilt is being used as a model to study some of the factors controlling ovulation in pigs. Treatment with Pregnant Mare Serum Gonadotropin (PMSG) and Human Chorionic Gonadotropin (HCG) has been shown to induce follicular growth followed by ovulation at a predictable time. As well as being potentially useful to induce puberty in gilts and post-weaning heat in sows, this model has been used to demonstrate that prostaglandins (PG) play an important role in ovulation, namely blocking PG synthesis will result in inhibition of ovulation. Research in this area is continuing. **B. Downey.**

Photoperiod and reproductive efficiency — Domestic livestock undergo seasonal changes in estrus and conception that can be attributed to different environmental influences. Research is directed toward environmental manipulation to maximize reproductive efficiency in cattle and swine. **J. P. Mahone.**

Fertility of boar sperm after freezing — The dairy industry has made enormous strides in improving herd production characteristics through the use of artificial insemination of frozen semen collected from superior herd bulls. The swine industry has not been able to benefit from this management tool due to inherent difficulties in obtaining a high percentage of fertile boar sperm after freezing. Boar sperm cells are being examined to identify the biochemical properties that are affected by the freezing process. These investigations also have important implications for identification of males with low fertility or the potential for transmission of birth defects at the time of fertilization. **J. P. Mahone.**



THE EMILE A. LODS AGRONOMY RESEARCH CENTRE

by Hazel M. Clarke

Keeping one step ahead by testing relatively new and/or small acreage crops in Quebec while at the same time, and on a much larger scale, constantly seeking to improve the tried and true does, in a few words, describe Macdonald College's 60-acre Emile A. Lods Agronomy Research Centre.

Since 1971, forages, cereals, corn, and weeds (on purpose!) have taken over approximately half the area that from 1932 until 1970 was operated as a Provincial Seed Farm. Dr. Harold Klinck, of the Department of Plant Science, took time recently to discuss the Centre's present function, its operation, and its goals. He also told me some of the history of the Centre, which is situated on the north side of Ste. Marie Road, adjacent to the Morgan Arboretum and about two miles from the Macdonald Campus.

"The 120-acre Farm was used for the purpose of providing pedigreed seed stocks to Quebec farmers, particularly of new cultivars — some of which were produced in our own program here, some of which were produced elsewhere but were well adapted to Quebec. At that time," Dr. Klinck continued, "one of the problems was that seed growers in Quebec were not organized — they were not interested in seed production per se. It was not until the early 60s that Quebec farmers became interested in seed production, and in 1968 they organized the Quebec Seed Growers Association. The farmers then began to develop good production practices, and as they began to multiply the basic stocks for other farmers in the province, our own seed farm became redundant. Back in 1920, Professor Lods, who was a member of the second (1912) graduating class from Macdonald College and taught here from

1916 until 1954, was responsible for initiating, with the Quebec Department of Agriculture, the Provincial Seed Farm, which began at Ste. Rosalie and was transferred to Macdonald in 1932, and from that time on he was supervisor of the Farm. It is more than fitting, therefore, that the new facilities be named after him."

In 1971, the Agronomy Department, which is now a part of the Department of Plant Science, took over the operation of half the land, the other half being used by the Macdonald College Farm. The research land is divided by discipline. There is an area that is assigned to the weed research people. They are responsible for this specific area and are confined to that area largely because of the nature of their work. As Professor Klinck pointed out, "when you start treating soils with herbicides that may have carry-over effects, you cannot use that land for certain other types of research. Another area is assigned to the forage crops people and again this is a problem — not of chemicals but rather of legumes versus grasses. Also in parts of areas being used for crops such as alfalfa, you may get winterkilling, which causes lack of uniformity in the land and ruins it for other purposes. Therefore, the forage people have an area which they operate in a rotation to suit themselves."

Dr. Klinck's own discipline is cereals and they, plus corn, occupy a third area. "A rotational system is necessary," he explained, "because we must have land which is not going to be contaminated with cereals from the previous year. For certain projects we must have clean land; in other operations we can get away with land where there may be the odd plant volunteer. We use basically a four-year rotation: two years of cereals, then corn, which gets rid of any volunteer cereals. Next we put

in a crop of red clover or soybeans that we can plough down for green manure to keep the organic matter level up. Then it's back to cereals."

Apart from these basic assigned areas, there are those that are unassigned and can be used as spill-over areas. "If we have too many cereals for our assigned area, we may spill over for a year, and others may do the same. We do have some flexibility."

A Brief Look at Research

In answer to exactly what type of research is being done, Dr. Klinck took his own specialty first: "We are conducting a breeding program on oats and barley. Part of this is testing work as well, which involves testing the strains we have developed, as well as strains that have been developed by other plant breeders, which may become named cultivars. Through this system we get a good picture of what other breeders have coming along as well. We also have testing programs for spring wheat, winter wheat, winter rye, and triticale, but we are not doing any cultivar development in these crops."

At the time of writing, Dr. Klinck explained that they were only doing testing work on corn. Testing of grass and legume species is also being done by the forage group, as well as some breeding work with such crops as reed canarygrass, red clover, tall fescue, and meadow fescue. They are also doing physiological research, management studies, etc., which often involve graduate students. The weeds group are mainly working on herbicide trials. Some graduate student projects are physiological in nature; others may be breeding oriented but are not a direct part of the regular breeding program.



Above: Dr. Klinck inspecting oat test plots. Below: New reed canarygrass cultivars are being developed.



Then there are miscellaneous crops which are only being tested. The information gleaned from these tests is passed along to the C.P.V.Q. (Conseil des productions végétales du Québec) and becomes the basis for their cultivar recommendation lists. Crops such as field peas, sunflowers, soybeans, rapeseed, and mustard, which is probably the newest to be introduced to Quebec, are being tested in order to get an idea of how the different cultivars adapt here. Although, at the present time, there is limited acreage in Quebec, the information is being gathered so that if an interest should develop, because of an industrial market for one or more of these crops, there will be some basic information. (A complete list of present testing and other research projects being carried out at the

Centre can be found at the conclusion of this article.)

Having dealt with how the land is divided, and touched on the type of research being carried out, we turned our conversation to those who, apart from the academic staff, make the Lods Centre tick.

"We have six full-time technicians there," Dr. Klinck said. "These are all people who are associated with the agronomy section of the Department of Plant Science. We also have about 12 summer students and there are always between 12 and 14 post-graduate students who are back and forth between the Campus and the Centre. We are fortunate in that we have a group of technicians that are well trained, very reliable, and very helpful. If we didn't have them, there is no way that we could

operate at all. A professor's time to do research is very limited because of other commitments, particularly during the school year. What we do is the planning and directing of the operation, but we really have limited time that we can spend in the field or laboratory ourselves.

"There are many projects underway, and the whole operation is based on teamwork," Dr. Klinck continued. "While we have certain technicians who are responsible to certain people, if there is a push to get the corn crop planted, for example, then all the technicians will help. The same at cereal seeding or corn harvesting. Therefore, while we basically have two technicians on cereal crops, part of their time is spent on forages or corn, or where the need is. This is unique because at most universities and research stations, a man will have a technician or technicians and they do nothing else but work on his projects."

The technicians are responsible for preparing the seed, making certain that the land is prepared, getting the seeding done, making sure that the weeds are under control, and that the required data are recorded on the material.

"In my own case in cereal breeding," said Dr. Klinck, "if there are crucial jobs such as selecting individual plants, then I do that myself. I do not rely on a technician to take that responsibility. He will see that the plants are in position whether they are growing in a plot or whether they are pulled and brought to the lab, but I make the final decisions."

Technicians are also involved with assisting graduate students in their projects depending upon the amount of material the graduate student

has. They do not do the projects for the students; the student has to be there, but they will work with them when necessary in order to make certain that the material is processed in the way that it has to be.

"It is a team effort," Professor Klinck pointed out, "with everybody involved in a wide range of activities, which adds to the interest and to the experience and makes it easier to move people around if necessary."

The original buildings at the Centre were a seed cleaning plant and a couple of storage barns. The Agronomy Department modified the seed cleaning plant and turned it into plant materials workrooms and storage area. In 1972, a large, unheated barn and workshop was built. The building, 150 by 40 feet, is used for storing machinery, threshing, and so on. In 1978, another building was constructed, which has six workrooms, two offices, a lunch room, and a fairly large storage area for research materials. There is also a fireproof room for storage of materials that they would not want to lose if there was a fire. These buildings and the land are not only used for research but also serve as teaching tools. "We have been giving a summer course — a two-week short course — on methods of agronomic research in which the entire course is taken at the Centre," Dr. Klinck told me. "We also use the Centre for some of our classroom demonstrations, particularly in the early part of the fall when we can still get into the fields with our classes. I am teaching a seed technology course — one at the diploma level and one at the degree level — in which we take students to the Centre to do seed processing because we have a good line of lab-size processing equipment. We also have a large controlled environment



A technician examines oat plots for straw characteristics.

germinator unit, and it is used extensively for growing and preparing plant material for classes which are held on the Campus."

The research being undertaken at the Centre is closely tied in with that being carried out in other locations. To emphasize this, Dr. Klinck talked about his cereal breeding program: "My work is a part of a much larger program carried out by the Quebec Cereals Project group. There are cereal breeders at the Agriculture Canada Research Station at Ste. Foy who are also doing breeding work. When their material and ours reaches the testing stage, it is tested not only at Macdonald and at La Pocatière, which is the Ste. Foy field station, but also at Lennoxville, St. Hyacinthe, Normandin in the Lac St. Jean area and Laval University in Ste. Foy. Thus we know that when we finally select a cultivar, it has been tested at all these places, and we are, therefore, fairly certain that it is going to be all right. In addition,

we have what we call local tests. In cereals, to provide the data upon which cultivar recommendations can be made, tests are conducted at approximately 25 sites across the province. This work is divided among the various research stations — Macdonald has a test on our own land here, one at Joliette, one at Thurso, and one at Ormstown. These are straight cultivar tests which we run on land rented from farmers."

In order to speed up the cereal breeding program, Dr. Klinck said that he sends material to the Imperial Valley in southern California. "This work is done in cooperation with Agriculture Canada, which provides this service to all cereal breeders across Canada. They collect the material, take it down to Brawley and plant it in November. We go down in late March or early April, make our selections and harvest the material. We are also beginning to develop a cooperative

program with CIMMYT — the Centre for Corn and Wheat Breeding in Mexico. One of my recently graduated students is working on a barley breeding program there, and this has facilitated us getting started in a cooperative barley program. Thus, in the future, we may have barley growing in the northern part of Mexico during our winter as well.

The inevitable question when discussing any research programs must be: how are they financed? I was told that a large portion of the research is financed by the Quebec Agriculture Research and Services Council, some by the Natural Sciences and Engineering Research Council, some by the Brewing and Malting Barley Research Institute in Winnipeg, and some by occasional grants from industry for specific programs. The University, as well, is supporting the Centre to some extent, because some of the technicians are paid from University funds.

In conclusion, Dr. Klinck emphasized that "the Lods Centre is a very useful research organization for the Department of Plant Science, especially for the agronomy section, but many of the projects involve other parts of the Department. We have cooperative projects with staff members in the plant pathology area and in the genetics area, and horticulture staff also make use of some of the facilities. It's an extremely useful Centre; we are fortunate to have it, and to have it under the control of the Department so that we can, in fact, organize and operate it in the way that is most effective for our particular purposes."

Research Projects at the Emile A. Lods Agronomy Research Centre in 1979

Cereal Crops

- Development of new oat cultivars with improved yields, lodging resistance, and grain quality.
- Evaluation of early generation testing as a breeding tool in oats.
- A study of the synchrony of spikelet and tiller development in oats.
- Development of techniques to culture anthers in oats as a means of producing haploids.
- Creation of higher yielding barley cultivars with stronger straw and better disease resistance.
- Evaluation of unculm (non-tillering) barley types.
- A study of the tillering habits of barley cultivars with a view to selecting types with limited and synchronous tiller development.
- Yield testing of named cultivars and plant breeders' strains of winter wheat, spring wheat, winter rye, triticale, barley, and oats.

Corn

- Yield testing of silage corn and grain corn hybrids.

Forage Crops

- Development of new reed canarygrass cultivars with low alkaloid concentration, higher forage yields, and improved seed retention and yield.
- Development of improved cultivars of red clover with longer persistence and resistance to root rot.
- Selection for increased yields and greater winter hardiness in tall fescue and meadow fescue.
- A study of the effects of climatic and management factors on persistence in red clover.

- Effect of herbicides on seed yield in red clover.
- Relationship of artificial shading and shading from various companion crops on establishment in birdsfoot trefoil.
- Evaluation of forage grasses as pasture.
- Evaluation of forage legumes as green manure crops.
- Comparison of methods of establishment in forage crops.
- Evaluation of cultivars of alfalfa, birdsfoot trefoil, red clover, white clover, timothy, bromegrass, orchard grass, and reed canarygrass, and of grass-legume mixtures.

Miscellaneous Crops

- Yield testing of named cultivars and plant breeders' strains of rapeseed, mustard, field peas, and soybeans.
- Cultivar test of processing peas used by canners in relation to root rot.
- A study of the relationship of different rhizobium strains to root rot in peas.

Weed Biology and Control

- Weed control in corn, small grains, and forage crops.
- Biological control of perennial weeds, e.g. nutsedge, quackgrass.
- Interaction of herbicides and root rot in canning peas.
- Effects of herbicides on sunflower cultivars.

Seed Multiplication

- Production of Breeder Seed stocks of cultivars developed at Macdonald College, such as Mirabel and Leo birdsfoot trefoil, Drummond and Milton timothy, Dollard red clover, Laurentian swede, Horton fall rye.

Selection of the Herd Boar

by **Professor James P. Mahone**
Department of Animal Science

About the author:

Professor Mahone obtained his Ph.D. from Michigan State University in 1977, followed by a year at Purdue University where he was awarded an NIH Post-doctoral Fellowship before coming to Macdonald. His work here includes teaching the course in Reproductive Physiology and research to improve reproductive efficiency in swine and cattle. Next spring the Extension Department will be offering a short course dealing with practical techniques in reproduction for the farming community.

Successful swine production requires supervision of many factors. The producer must possess a wide base of scientific and technical knowledge to assess the value of specific innovations and techniques to his own operation. Of paramount importance to the hog breeder is the maintenance of high levels of reproductive efficiency.

Reproductive efficiency is determined by the genetic potential of animals selected as breeding stock as well as by their environment. This is the first in a series of articles related to swine breeding designed to provide useful information for anyone interested in swine production, from the "hobby" farmer to the large scale swine producer. Subsequent articles will describe evaluation of the female as well as management practices to increase the reproductive performance of the boar and sow.

The most rapid improvement in the genetic pool can be brought about through the use of superior herd boars. However, even boars with the most impeccable records are of limited value if they are incapable of maintaining a high pregnancy level in the swine herd.

Records indicate that about 8 to 12 per cent of all young untried boars have a fertility problem of some

nature that renders them either sterile or sub-fertile. All possible precautions should be taken to prevent introduction of these animals into the breeding program.

Six factors should be considered by the swine herdsman when assessing a potential herd boar:

- 1) Genetic merit
- 2) Health and physical condition
- 3) Libido
- 4) Ability to mount correctly
- 5) Ability to mate properly
- 6) Semen quality

Genetic Merit: Success depends on the use of genetically superior boars. Both purebred breeders and commercial breeding associations have boars that excel in economically important traits. Select a boar that will improve the weak points of the herd without sacrificing the strong points.

Insist on having individual performance records available when choosing a boar. If possible, select only those in the top 50 per cent of the herd or test group. Pedigree gives the ancestry of the boar and is most useful when combined with the performance records of sex related traits such as milk production and mothering ability of relatives listed in the pedigree.

Select only those boars from litters with 10 or more farrowed and eight or more weaned. Number of pigs farrowed and weaned and individual pig and litter birth weights are the most common measures of sow productivity. Litter weight at 21 days per sow exposed to boars is probably the best measure of sow productivity. Use the sire and dam litter records, records of other relatives, and any records available on the boar being selected.

Traits associated with soundness include teat spacing, (number and presentation); physical soundness of feet and legs; bone size and strength; genetic abnormalities (hernia and cryptorchidism); and mating ability (tagged penis, short penis, limp penis).

The conformation-type traits include those used in visually evaluating boars such as body length, depth, height, and skeleton size (those items used in describing ruggedness, frame and body capacity); muscle size and shape; and boar masculinity characteristics and testicular development.

Select on the boar's own record for length and height. Physical soundness traits should be selected for on the basis of the boar's own record with some attention to littermate and other close relatives. Insist that relatives of selected boars be free of genetic abnormalities and mating ability defects and rely on the breeder's integrity.

Boars used as herd sires should have two or more fully developed, well spaced teats, weigh at least 230 lbs at 155 days of age, between 60 and 230 lbs have a feed/gain ratio of 275 lb/hundred wt. or less, and a daily rate of gain of 200 lbs/day or greater. Backfat probe thickness adjusted to 230 lbs should be one inch or less.

Purchase boars that were reared in an environment similar to that in which they will be used. If the seller raised his boars on soil and the buyer maintains them on concrete or slats, lameness may result.

Health and Physical Condition

The overall health status and breeding soundness of a boar may be determined prior to purchase. Buy boars from a herd that has a

good herd health program. Observe all animals in the herd. Obtain information on herd health treatment and the nutritional program followed in development of perspective boars. Reputable breeders will give written health management records for the boars.

Select and purchase boars at six to seven months of age for use beginning at a minimum of eight months of age. Most boars do not reach sexual maturity until about seven months of age and many boars are used at too young an age because they appear to be large enough. It is recommended that all boars be purchased at least 60 days before the breeding season starts. This allows them to be isolated, checked for health, conditioned to the farm, and evaluated for reproductive performance.

Chances of health or parasite problems are greatly reduced by purchasing boars from clean herds. Exactly what health measures are needed depend largely on the previous health-management record of the boar. Regardless of that record, however, the buyer should have all purchased boars inspected by a veterinarian sometime during the initial 30-day isolation period. The following health measures during that time are recommended:

- 1) Ask the seller if the boar has recently been treated for internal and external parasites. If not, do so immediately.
- 2) The boar should be revaccinated for erysipelas and leptospirosis.
- 3) The boar should be from a validated brucellosis free herd. If he is from a nonvalidated herd, he should have passed a negative brucellosis test within 30 days before purchase. An additional 30-45 day period of fence-line exposure to the sow herd is recommended to develop immunities before use.

Boars must be free of feet and leg problems. Specifically, they should be free in movement, the legs should be medium to large with a wide stance in both front and rear, have good cushioning on the front and rear feet, and equal size toes. It is also essential to observe the presence of both testicles and to

palpate the testicles and epididymis for size and firmness.

Libido Evaluate the boar's characteristic behaviour, aggressiveness, and desire to mate. Fat animals often have low libido and poor fertility and should not be used. Most libido problems are psychological rather than hormonal. Hormonal treatments are usually useless and could even tend to be detrimental. Take a gilt in estrus to the boar and observe the boar for aggressiveness and desire to mate.

Ability to Mount Evaluate the boar's ability to mount an estrus sow correctly, if he possesses adequate libido. Common causes of failure at this stage are arthritis or other lameness, injuries, or mounting the anterior end of the sow.

Ability to Mate This describes the boar's ability to erect and properly enter the female. Boars have been observed to ejaculate normally while the penis is in the diverticulum or entered into the rectum of the sow. Also, examine the boar for an anatomically normal reproductive tract. Limp or "infantile penis" and the patent frenulum or "tied or tagged penis" are commonly observed. All of these are thought to be heritable and boars exhibiting these conditions should not be used in purebred herds. Examinations for injuries to the penis should also be made at this time. If a gilt is mated, observe her 18-22 days later to determine if she becomes pregnant. More than one gilt should be bred for best accuracy.

Semen Quality To evaluate the semen properly, semen must be collected from the boar directly and not from the female after natural mating. Boars can be trained to mount a collection dummy or semen can be collected using an estrus gilt as a mount animal. The hand pressure technique is the easiest and most practical method of collec-

tion. The objective of the hand pressure technique is to stimulate the cervix in which the penis becomes interlocked during the natural service.

Ejaculation normally takes from 7 to 10 minutes but can be considerably longer with older boars. Evaluation of the semen quality follows the collection of the semen. The total volume of the ejaculate is in the neighborhood of several hundred mls in most boars. This is dependent on age with 100 mls or less being characteristic of relatively young boars and semen volumes in excess of 400 mls occasionally being found in larger more mature animals. The relative sperm concentration should be chalky; however, it can be watery in very young boars. Normal ejaculates are white in colour. Yellow semen indicates the presence of urine, while pink indicates contamination with blood. Contamination may consist of dirt, etc. that has been collected along with the semen.

A thorough evaluation examines the individual population of the sperm cells using a microscope. The average and minimum acceptable values are given in Table 1.

The techniques involved in semen evaluation are relatively simple to learn and require only moderate expenditures for equipment. For the serious swine breeder the time and money invested in becoming proficient in semen evaluation would be very well spent.

There is no absolute lab test for fertility; but through fertility evaluation, it is often possible to detect the sterile boar or one of questionable fertility. If a boar exhibits adequate libido or sex drive, has a visibly normal reproductive tract, and if tests are taken and reveal good semen quality, chances are high it will be a valuable addition to the herd.

Table 1.

Characteristic	Average	Minimum acceptable
Percent motility	80%	60%
Total sperm per ejaculate	30-50 billion	10 billion
Percent normal sperm	90%	75%

Behaviour of Volatile Flavouring Components During the Freeze Drying of Liquid Food Extracts

by Professor T. Smyrl
School of Food Science

Liquid extracts, such as those derived from coffee, tea, fruit juices, and vegetable juices, are potentially capable of being dried to produce instant beverage powders. The goal of the producer in manufacturing instant beverage powders is to provide a product, which upon rehydration, yields a drink with a rich, full bodied true flavour, since flavour is one of the most important quality attributes that a food may possess.

The transformation of a liquid food extract to a beverage powder involves the removal of water by processes such as spray drying or freeze drying. To satisfy the flavour requirement in the product, any food liquid extract which undergoes dehydration should have flavour characteristics which closely match the flavour associated with the extract. If these flavouring characteristics are altered during dehydration, either by a physical or a chemical process, the flavour of the rehydrated powder will be inferior to that of the initial food. Thus it is essential that the flavouring substances be retained during water removal and knowledge of the behaviour of the flavouring substances during dehydration is required to ensure that these flavouring substances are indeed retained to a maximum extent. Since freeze dried instant coffee is one of the most popular instant beverage powders on the market, I would like to discuss the behaviour of the flavouring compounds during dehydration with special reference to coffee.

The flavour of any food is largely attributable to the presence of a wide variety of organic compounds such as alcohols, esters, aldehydes, ketones, and pyrazines. The flavour profile of many foods is extremely

complicated. Coffee, for example, has been shown to have at least 700 separate chemical components which are responsible for the taste and aroma of this beverage. These flavouring compounds are extracted from the coffee along with soluble carbohydrates, acids, and proteins using a combination of water and steam treatments. Within the extract many of these flavouring components are present in very low concentrations, i.e., in the parts per million (ppm) or parts per billion (ppb) range. The boiling points of these flavouring components may vary from below 0° to 250° C; however, it has been shown that when such flavouring components are present in aqueous solutions at such low levels, they are in fact much more volatile than the water within the same solution irrespective of their boiling points. The relative volatility of a dilute flavouring component with respect to water within the same solution may be defined by the ratio

$$\text{Relative volatility} = \alpha_{jw} = \frac{\gamma_j P_j^\circ}{\gamma_w P_w^\circ}$$

where subscripts j, and w refer to the flavouring component and water respectively, α refers to the thermodynamic activity coefficient and P° represents the vapour pressure of the pure species. The flavouring component 2-heptanone, for example, has a molecular weight of 114 and a boiling point of + 150°C. When 2-heptanone is in aqueous solution at ppm levels, it has an $\alpha_{j,w}$ value of 200. In other words, it is 200 times more volatile than the water molecules within the same solution.

So basically, the problem that the manufacturer of a flavourful powder must deal with is one involving the preferential removal of water from

the food extract while at the same time avoiding the physical loss of volatile flavouring components which are in fact much more volatile than the water within the food. One method that the processor has to accomplish this task is by the freeze drying technique.

Freeze drying is a dehydration process in which water is removed from a frozen product, by sublimation, under vacuum. Since freeze drying is a low temperature process, the loss of flavouring components by chemical degradation may be considered negligible. As well, since water removal occurs from the solid state, spillage losses of flavours resulting from frothing and bubbling are eliminated.

The first step in the freeze drying of a food extract consists of freezing the sample. During the freezing of the aqueous extracts, water separates out as pure ice crystals as the temperature is decreased below 0°C. The lower the freezing temperature, the greater is the amount of water which forms pure ice. Since a portion of water is separated as pure ice, the solution remaining which contains flavouring compounds, dissolved carbohydrates, acids, etc., becomes more and more concentrated. Coffee extract, cooled to -20° C, can generally be considered to have two components: ice and a very concentrated solution. Pictorially the frozen extracts may be represented by Figure 1 which shows the frozen extract to assume a complex honeycomb-like structure. The concentrate regions at a temperature of about -20° C have dissolved solids concentration of up to 70 wt% (70 g dissolved solids per 100 g solution). These highly concentrated regions at very low temperatures have very high viscosities and thus can be considered as being essentially rigid.

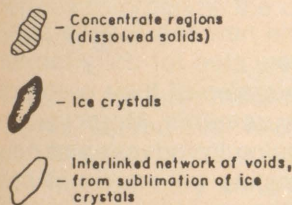
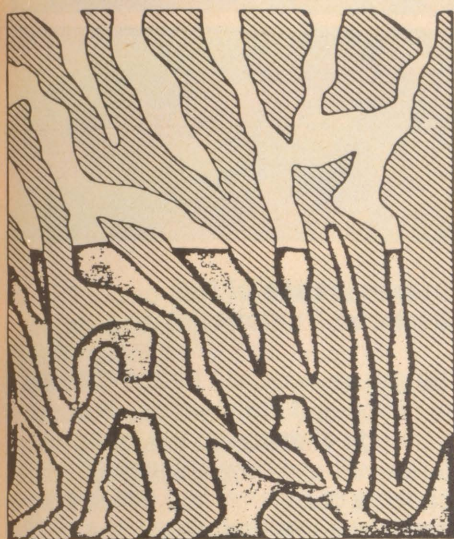


Figure 1. Segregation of ice and concentrate during freezing of liquid solutions; porous matrix left after removal of ice by sublimation.

The next step in the freeze drying process involves application of a vacuum to the frozen sample. Under reduced pressure water passes directly from the pure ice crystals to the vapour state leaving behind a very porous network above the ice front as indicated in Figure 1. Since the matrix remaining after disappearance of the ice crystals is porous, freeze dried products will rehydrate quickly and completely as water of rehydration can easily move through the open pores to all portions of the sample. Following the passage of the ice front, water is removed from the concentrated regions (30 wt% water after freezing) as it moves or diffuses to the open pores from the interior portion of the concentrated region. Once the water reaches the pore, it is lost to the vacuum by evaporation. Thus the water removal from the extracts is a two step process — sublimation and evaporation. At this point, it should be recalled that the volatile flavouring compounds which were initially in the liquid extract are also incorporated into the concentrate region during the freezing stage. If these compounds are to be lost to

the vacuum, they too must move from the interior portions of the concentrated region to the open pore above the ice front by the diffusion process in a manner similar to that of water.

Diffusion studies on organic compounds and water in carbohydrate containing aqueous solutions have been carried out by Thijssen and co-workers in The Netherlands. Figure 2 illustrates the relationship between the diffusion coefficient (D) of acetone (a flavouring volatile of coffee) and water in a model solution containing the carbohydrate, malto-dextrin, as the dissolved solid. Figure 2 shows two important things. As the wt% water in the model mixture (acetone, water, and malto-dextrin) decreases or equally as dissolved solids concentration increases, the ratio D acetone/ D water decreases. For example, by inspection of Figure 2, it is easy to see that in a solution of 70 wt% malto-dextrin at -15°C , the ratio of D acetone/ D water is approximately equal to 5×10^{-3} . In other words, the water molecules have the ability to move through the solution 500 times faster than the organic molecule, acetone. The ability of water to

move more easily than organic flavouring compounds such as acetone is termed the selective diffusivity of water.

The results of Thijssen's diffusion studies can be extended to explain what is happening during the freeze drying of the liquid food extracts. As noted both water and the flavouring component have the potential to be lost by diffusion through the concentrated region to the open pore above the ice front. However, due to the selective diffusivity of water in concentrated solutions, water will have a much greater tendency to move to the pore than the flavouring organic molecule. As water is preferentially removed, the concentrated region increases in dissolved solids content, and further promotes the selective diffusivity of water.

In addition, as pointed out previously selective diffusivity is enhanced by the low temperatures employed in freeze drying. Thus the volatiles which do remain in dried region are truly locked in place and are fully released only upon dissolution of the carbohydrate during rehydration. Partial release of the flavouring compounds from the dried solids

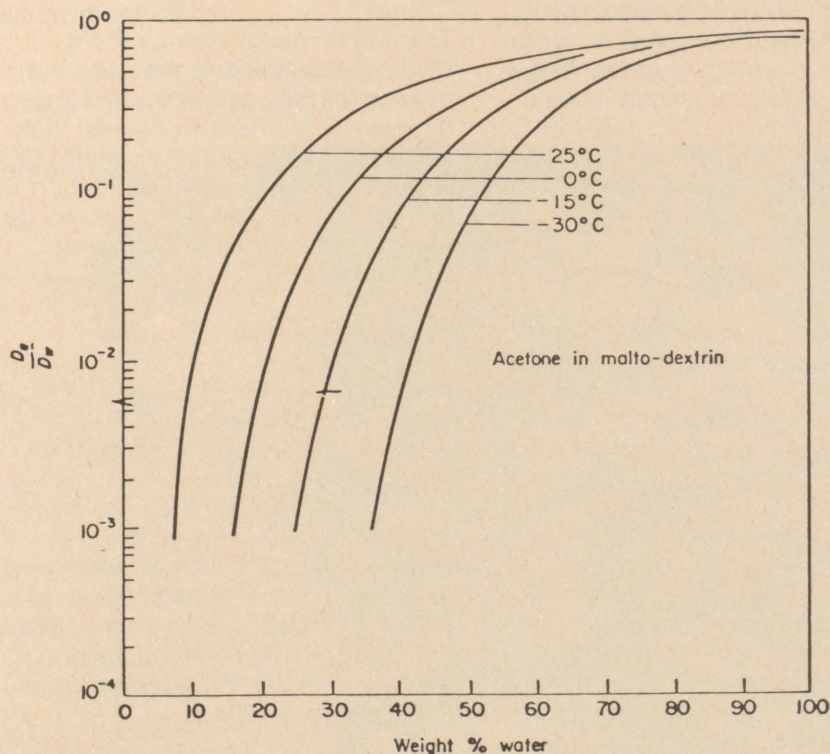


Figure 2. Effect of water concentration in malto-dextrin on the ratio of the diffusion coefficients of acetone and water. Temperature is taken as parameter.

(Continued on Page 16)

The Family Farm



Published in the interests of the farmers of the province by the Quebec Department of Agriculture.



NEW REGULATIONS CONCERNING THE PAYMENT FOR MILK AND CREAM

The Québec government has amended the regulations concerning payment by milk dealers to milk producers for milk and cream. These amendments were made because of the conversion to the International Measurement System (SI) and came into force August 1, 1979.

In addition to introducing the SI units, the new legislation is designed to standardize and modernize methods determining the butterfat content of the milk of producers of processing milk and producers of fluid milk.

The new legislation concerning the payment of milk prescribes, among other things, the procedures for measuring and sampling milk and testing it for butterfat content. On the other hand, the legislation concerning the payment of cream has been only slightly amended; units of the SI system have been partly introduced, but the method of sampling and butterfat testing remains the same.

Payment of Milk and Cream

With the coming into force of these regulations, the producer will notice some changes on his pay-slip, including a new procedure for calculating the payment for his product.

Thus, milk will be paid for according to the volume delivered measured in hectolitres (100 litres) and its butterfat content in kilograms per hectolitre (1 000 grams/100 litres).

Henceforth, the final milk payment by a milk dealer will be made by cheque before the 16th of each month. On the first of each month, the milk dealer will make a down

payment on the milk delivered during the first 15 days of the preceding month.

The pay-slip will show the name and address of the milk dealer, the place where his plant is located, and the number of the producer. It will also include information about the volume of milk delivered during the month and on its butterfat content, the volume of milk in each different category or price class and the basic price for each class, the total price for the milk delivered and a detailed account of the sums deducted from the total price, and the amount paid, and the date on which it was paid.

Measuring of the Volume of Milk

There is no major change in the methods now used to measure the quantity of milk delivered. Milk producers will not have to change their equipment. However, they will have to get a new calibration table for their bulk tanks and this table will be used to determine the volume of milk in the tank.

Sampling of Milk

At each collection, the tester of the tank will have to establish the volume of milk transferred from the cooling tank to the delivery tank. He will also take a sample of the milk in the cooling tank. This sample will then be taken to the plant where, together with the samples taken at the other collections from this same producer's farm, it will be used to prepare a representative sample of the month's deliveries.

It is the butterfat test of this composite sample which will be used in calculating the payment for the milk.

Determination of the Butterfat Content

To ensure accurate butterfat determination and standardization of methods of analysis, the laboratories will use new equipment capable of determining and expressing to two decimal places the butterfat content of the sample.

In short, the new regulations constitute a new step for dairy farmers in the conversion of their enterprise to SI measurements. Moreover, the accompanying introduction of new butterfat testing will enable all producers in the processing milk sector to enjoy the same technological advantages.

A CAREER AS A FARM MACHINERY MECHANIC

L'Institut de technologie agricole et alimentaire (ITAA) de Saint-Hyacinthe offers young people from the farming sector the possibility of a rewarding career as farm machinery mechanics.

According to Bertrand Pelletier, secretary of the Comité consultatif en machinerie agricole, some 15 students receive their diplomas in this field each year. An internal survey by the Committee shows that about 80 per cent of them find work with wholesale or retail machinery dealers at the end of their course while the rest either put their training and knowledge to use on their own farms or decide for various reasons to go in for something else. These praiseworthy results confirm the need for the Institute to continue to offer specialized training in farm machinery mechanics. Indeed, starting this year, the accepting of more students is being considered.

Theory but also practice

The aim of the course provided at

the ITAA is to train specialists in the maintenance, repair, and adjustment of farm machinery. The need for them was voiced some years ago by wholesale dealers and by the Association des marchands de machines agricoles. Aware of this need, the Comité consultatif en machinerie agricole of the ministère de l'Agriculture du Québec then undertook to organize the course now being given.

The course for farm mechanics lasts 20 weeks, spread over two years. This year, the first session will be from January 14 to March 21, 1980. The second session will start in January 1981. Between the two sessions of the course, the student must put in nine months of practical works with a retail or wholesale dealer.

To be eligible for this course, the young applicant must come from the farming sector, hold a Grade 10 certificate or the equivalent and have had at least one year's experience of work. Priority will be given to applicants who have already had a little experience with a farm machinery dealer and thus show their interest in a career in this field.

Gervais and Yves Ouellet

It is clear that the two brothers, Gervais and Yves Ouellet, are quite satisfied with their choice. Both obtained their diplomas from the Institut de technologie agricole et alimentaire and both work as farm machinery mechanics with the Coopérative des Bois-Francs at Victoriaville. Gervais, the elder, was in the first group of students six years ago. Yves just finished the course this spring. They come from the Bois-Francs farming sector and admit that the course they took at Saint-Hyacinthe was a real eye-opener for them, even though they already had some knowledge of

farm machinery. Neither regrets having taken the course — far from it in fact! They even declare that if they had to do it all over again, they would go back to Saint-Hyacinthe. The basic principles they learned during the course are useful to them every day. When he finished his mechanic's course in farm machinery, Gervais Ouellet was engaged by a Victoriaville dealer. Then, the Coopérative des Bois-Francs offered him interesting work as a repairer of small machinery (garden tractors, etc.). Yves, on the other hand, got his first experience by assembling machinery and getting it ready for delivery to the buyer.

La Coopérative des Bois-Francs employs about 10 mechanics, including the two Ouellet brothers.

Better fitted to become good mechanics

The machinery director at the Coopérative, Mr. Verville, believes

that the young people who take the ITAA course are more likely to become *good* farm machinery mechanics. "I'm the one who advised young Ouellet to take the ITAA course and he came to the Coopérative to do his nine-month practical stage," says Mr. Verville. "We have just engaged him to do some assembling, amongst other things. The course gives very good training in maintenance and assembly work. Service technicians from machinery companies even take an active part in a number of the Saint-Hyacinthe courses."

Mr. Verville adds: "There is just one thing I might find fault with in the farm machinery mechanics' course, and it is really more of a wish than a complaint; it is that the course could be more intensified and even more specialized. For example, use of electronics is becoming increasingly widespread in farm machinery; yet there is still no time allotted in the course to this subject."



Gervais Ouellet, left, and his brother Yves, both ITAA students, work as farm machinery mechanics at Victoriaville.

Jean-Louis Marcoux, who is with Maheux & Frères, a Victoriaville dealer, has at present no employees from the ITAA. "It just happens to be that way just now," says Mr. Marcoux. "I have already had some and I will hire more, in preference to any other applicants." As he states quite frankly, 10 to 12 years are needed to train a good mechanic who starts from scratch. "That's much too expensive; we can't do that. On the other hand, a young man who takes a mechanic's course has already had good basic training.

He becomes a good mechanic much faster. Naturally, that interests us as wholesale and retail dealers . . ."

Mr. Marcoux adds "It is true that a good auto mechanic may fairly quickly become a good farm machinery mechanics." But although wage conditions are equivalent in the two sectors, working conditions are different. We have to face the fact that they are more difficult in farm machinery. "During the farming season, the

working day may be long and holidays few. In fact, a tractor or any other farm machine has to be repaired without delay because crops, for example, cannot wait!" Therefore, besides his theoretical training, the young ITAA graduate has another advantage. As he is from the farming sector, he knows, understands, and fits into this special kind and pace of life. "This also is important for us," concludes Mr. Marcoux. "When we have a good mechanic, we want to keep him as long as possible."

(Continued from Page 13)

may occur when the dried matrix is subject to an atmosphere of high relative humidity. Of course, this partial release will represent a flavour loss so it is not surprising that some manufacturers of instant coffee incorporate desiccants into the container to ensure that the moisture content of the dried material remains low, thus keeping the volatile flavouring compounds trapped. If these compounds are trapped, why do we smell the coffee aroma when we open a jar of instant coffee? Instant coffee producers insure coffee aroma when the package is opened through the procedure of aromatization in which the dry powder is sprayed with coffee volatiles just prior to sealing.

In the commercial production of freeze-dried coffee, the producer strives to maximize the volatile flavour retention. Since the flavouring volatiles do have a finite ability to diffuse through the concentrated regions and hence be lost to the vacuum, freeze drying parameters must be regulated to minimize the loss. Thus the producer will freeze dry, for example, a concentrated coffee extract which has a dissolved solids (carbohydrate) content higher than that of the original extract. Normally liquid extracts from the coffee bean contains 10-15 wt% soluble carbohydrate; however, by processes such as evaporation with aroma recovery, freeze concentration or reverse osmosis, the dissolved carbohydrate content may be increase to 30-35 wt%. The advan-

tages of using a concentrated extract are two-fold. As the dissolved solids content increases in the freeze dried sample, the retention level of the volatile flavouring components increases with increased initial dissolved solids. The concentrated regions, as depicted in Figure 1, are thicker after freezing, thus the volatile flavours will have to diffuse a greater distance to the pore if they are to be lost to the vacuum. Secondly, the use of an elevated dissolved solids content as found in the concentrated extract provides an economic benefit since less water has to be removed by the relatively expensive freeze-drying process to produce the dry powder.

The rate at which the sample is frozen prior to vacuum treatment is also an important parameter which influences the degree of flavour retention. Slow freezing of the sample (e.g., -20° C in still air) enhances volatile retention whereas fast freezing (-196° C, liquid N₂) is not conducive to high levels of retention. Again, as outlined in Figure 2, slow freezing has been found to promote the formation of thicker concentrate regions and higher retentions. The freezing rate of coffee extract is also of prime importance in the actual colour of the freeze dried product. Slow freezing yields a deep coloured powder whereas fast freezing gives a much lighter coloured product.

Research has also shown that the pressure within the vacuum chamber also has a pronounced in-

fluence on the retention of flavouring components. Generally, it has been found that low chamber pressures (below 0.7 torr) are required to enhance flavouring component retention. Higher chamber pressures cause deleterious changes in the structure of the concentrated regions resulting in flavour loss.

By careful manipulation of parameters such as initial dissolved solids content, freezing rate and chamber pressure, the producer is able to achieve very high retentions of volatile flavouring components in the freeze dried product. The great market success of freeze dried coffee attests to the success of the method. Since freeze dried coffee has been so well accepted by the consumer, it is expected that there will be future growth in areas such as dehydrated tea and fruit juice extracts. In addition, with the increase in eating away from home, the consumption of beverages such as coffee will become more of an institutionalized process. Under these circumstances, the maintenance of flavour in a quickly preparable beverage is the most important criterion for institutionalized use.

Within the School of Food Science at Macdonald current research is directed toward other factors which may influence the retention of volatile flavouring components during freeze drying. In addition, the behaviour of volatile flavouring components is being studied in the spray and Osmovac drying technique.

QWI

(In all, we have received six reports on the FWIC Convention. As a result, Mrs. von Brentani's column and other QWI news will not appear in this issue.)

FWIC Annual Board Meeting, University of Saskatchewan, June 22-23, 1979

Mrs. Martha Bielish, National President, welcomed the members gathered in the Conference Room in Saskatchewan Hall. She introduced Mrs. Janet Morgan, Executive-Secretary as of June 4, 1979. Mrs. Morgan was appointed Recording Secretary for the Board Meeting.

Roll Call was answered by a written submission of "My Priority for FWIC Programs and Projects." The 28 voting members present showed a concern for the youth in suggesting studies on family, children's laws, teenagers, home and country, communications, nuclear energy, unity, safety, restitution, etc. Make a study of Canadian industries and have community workshops to bring out ideas to prompt action were other suggestions brought forth. A national organization such as ours should use its power to bring forth change for the betterment of society.

In the President's report it was noted that the funding for CRDC (Council on Rural Development Canada) had been cut off March 31, 1979. The Board passed a recommendation that the Government of Canada reinstate CRDC or form a similar body.

Mrs. O. Thomson, who has represented FWIC on the International Peace Garden Board for 20 years, tendered her resignation. Sincere congratulations were extended to Mr. and Mrs. Thomson on the occasion of their Golden Wed-

ding Anniversary. Mrs. Eileen Brake of Boissevain, Manitoba, is replacing Mrs. Thomson. In 1982 the Peace Garden will celebrate its 50th birthday.

British Columbia WI presented Mrs. Bielish with a towel commemorating their 70th Anniversary. The Souvenir Towel commemorating the 60th Anniversary of FWIC was displayed. These may be ordered from the FWIC office at \$3 each in lots of 10 or more. Individual towels are \$3.25.

The Secretary's report showed a membership of 51,021 in 2,576 branches.

The amendments to the By-Laws were presented and, after discussion resulting in some changes, were accepted. The term National Secretary-Treasurer shall be changed to National Executive Secretary.

Those eligible for nominations for President Elect of FWIC, by a Provincial or Territorial Unit, are those Vice-Presidents who have been named as representatives by their Provincial or Territorial Units during the triennium preceding the National Convention.

As FWIC Life Memberships are given for outstanding service at the National level, an Award of Merit is provided for those who have given outstanding service to the organization. This is applied for by the Provincial or Territorial Unit in which the member resides.

Plans were announced for an ACWW Mini-Conference for eastern Canada in March 1980, at Memramcook, N.B. Representatives will be invited from the WIs and other constituent societies of New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, and

Quebec as well as the Maine Extension Homemakers. The objectives of the conference are to create an awareness and better understanding of ACWW and of women in the Third World.

There are 14 Constituent Societies of ACWW in Canada. FWIC agreed to support an invitation for the 1983 ACWW Conference to be held in Canada. Suggested venues were British Columbia or Alberta. All societies in Canada must agree to hosting the conference.

Some of the recommendations coming out of the reports of the Education Committees were: make members of the community aware of FWIC's position on land use, use Canadian products, learn more about your province's industries with the aid of a slide presentation, know the laws as they pertain to children and be aware of any new laws, continue any projects started for International Year of the Child, and make use of the Safety Kits assembled for the 1979 contest.

In 1979, a conference was held at Inuvik with eight other communities of the McKenzie Region in attendance. Plans are underway for a conference to be held at Yellowknife in the Great Slave Area. FWIC plan to assume the cost of bringing two ladies from northern Labrador to the Newfoundland and Labrador Convention at Cornerbrook in 1980.

Two delegates, Annie Gordon from Aklavik and Rachel Stewart from Ft. McPherson, attended the Saskatoon Conference. Before they left for their home in the North, they spoke to the group telling of some of their projects, such as layettes for newborn babies, gifts for elderly on Thanksgiving Day, a picnic on Mother's Day, etc. At the same time

they thanked members for the friendliness shown them. In return they were well applauded in appreciation of the added interest they had brought to the Conference.

Many resolutions were accepted:

1. That spouses that remain at home be permitted to contribute to the Canada Pension Plan on a voluntary basis as a self-employed worker.
2. That FWIC express their displeasure with TV commercials advertising feminine hygiene products.
3. That FWIC support the National Council of Women's resolution concerning kidnapping of children from the person given legal custody in divorce settlements.
4. That FWIC urge that there be a ban on advertising of highly sweetened products to children of seven years and less.
5. That the spouse's allowance of a deceased pensioner be continued until the age of 65.
6. That elections, both federal and provincial, be held at fixed dates and intervals with provision for appropriate timing of by-elections and bearing in mind that an election would be held upon the defeat of the government on a major issue.
7. That FWIC urge the government of Canada to establish, together with the provinces and municipalities, an overall policy on hazardous waste disposal.
8. That manufacturers be urged to use a larger print on medication for safer, easier reading.

The addition and landscaping to the Hoodless Homestead is completed. The Opening of the addition took place June 1, 1979. Mrs. Loveless resigned as hostess which became effective November 1, 1978. Mrs. Hilda Butler, of Port Dover, replaced Mrs. Loveless March 1, 1979.

One application was received for the Hazel Alward Stiles Award and was accepted — Mrs. Esther McIntosh of Bathurst, N.B. This \$500 Scholarship is made possible by a bequest from the estate of Hazel Alward Stiles, a life member of New Brunswick. Her talent lay in helping teenagers prepare for the adjustment between public school and high school. Application for this scholarship should be received in the Provincial Office by December

of the previous year, and it will then be forwarded to National Office.

On Friday, June 29, the Post-Conference Board Meeting convened at 9 a.m. in the Gold Room of Athabasca Hall with the new President, Mrs. Emmie Oddie, in the chair.

Registration for the Convention showed 423 full-time delegates and 339 day visitors making a total of 762 plus 40 husbands.

The President asked that thanks be conveyed to all members for the articles donated for sale at the Gift Stall. They were of excellent quality and brought in \$4,600.

The various committees were appointed. Quebec's Vice-President for FWIC is Chairman of the Education Committee, Canadian Industries, and is a member of the committee for Canadian Unity.

Suggestions for the next triennium competitions were given. Regulations for these will come later.

The Eighth National Convention came to a close with many plans for the next triennium.

Mrs. Sterling Parker,
1st Vice President,
Quebec Women's Institutes.

FWIC Triennial Convention

The eighth national convention of the Federated Women's Institutes of Canada was held at the University of Saskatchewan, Saskatoon, June 24 to 28, 1979, the theme being "Perspectives and Priorities."

The official opening was held in the gymnasium of the Education Building, which was beautifully decorated with stalks of grain creating artistic designs.

The President, Mrs. Martha Bielish, presided. The evening opened with the singing of O Canada, followed by the Mary Stewart Collect. A moment's silence was observed in memory of those members who had passed away during the past triennium. Greetings were received from Her Majesty, the Queen, and the Right Honourable Joe Clark, Prime Minister of Canada. Dr. Ellen McLean, Area Vice-President for

ACWW brought greetings from the mother society. She spoke of the many affiliations and reminded us that we were one nation under God. We were responsible as Canadians to the world community. Mrs. Merle Williamson, President of the Saskatchewan Women's Institutes, welcomed all delegates.

Dr. R. W. Begg, President, University of Saskatchewan, welcomed us to the University. In his welcome he spoke of the size of the grounds — 2,500 acres at this site, and seven sections of land on the outskirts of the city. There are 10,000 students and 1,000 faculty. With all the maintenance staff included, there are approximately 16,000 people per day using the beautiful facilities. It even has a holding in the Northwest Territories that has never been touched by plough.

Personal greetings were extended by Mr. Cliff Wright, Mayor, City of Saskatoon, and Mr. Paul Mostowoy, M.L.A., Government of Saskatchewan.

Mrs. Bielish spoke of our theme "Perspectives and Priorities." This being International Year of the Child, the Aberdeen Singers, a group of school children who had been trained by their teacher, Miss Susan Speck, entertained us with several songs.

The presentation of Awards then took place and were presided over by Mrs. Emmie Oddie. We were very happy to have a Quebec WI member, Mrs. Joyce Carmichael of Black Cape WI, win the Tweedsmuir Trophy for her Painting. There had been 14 entries in this class.

The Black Cape Institute branch also won Honourable Mention on their Afghan. There had been 19 entries.

Mrs. V. Ignatieff, Spooner Pond WI, won second prize in the Cairine Wilson Competition for her House Log. There were nine entries from across Canada. I think this is a very good showing for our Quebec Women's Institutes.

Father Larre, O.M.I., was the guest speaker. His topic was "Children: God's Greatest Gift." He had worked for many years with delinquent children and was a child

counsellor. He told us that very often a child wanted love but was afraid to accept it. Because they felt the lack of love, they rebelled. The essence of human happiness is to love and be loved. He, too, reminded us that we were one nation under God and that we had a responsibility to the world.

Dr. Larre said that there was a great need for an organization such as ours "for Home and Country," and that good homes and good families are the pillars on which a nation rests. He was very ably thanked by Dr. Ellen McLean.

The Past Presidents of FWIC who were in attendance were welcomed. Following the evening session, a reception was held, courtesy of the University of Saskatchewan.

Monday Morning

The Monday morning session started by a singsong with Vera Petty leading and Junice Headley at the piano. The President, Mrs. Bielish, presided, assisted by Mrs. Marjorie MacAlpine. Mrs. Betty Ballhorn was recording Secretary. The minutes of the 1976 Convention were approved, and the President gave her report. She spoke of the changes in the last triennium. She said that the new constitution and by-laws had provided interest and education. Each province now has direct representation on the Executive. One has the President, another the Past President, and the third has the President-Elect with the remaining seven provincial units each having a Vice-President. The fact that these Vice-Presidents have become Conveners of Educational, Administrative, and special committees is definitely an improvement, but their responsibility and work load is much greater.

Mrs. Bielish spoke of the many projects such as the wells for Kenya from Alberta, wells for Zambia from Manitoba, the Landrover for Lesotho, the Adelaide Hoodless Anniversary Fund, the FWIC brochure, and the tea towel.

She thanked everyone for their cooperation and help and said that it had been a privilege to serve as President.

A beautiful replica of the Adelaide Hoodless Home was presented by Mrs. Eileen Brake of Manitoba. Each provincial president deposited her province's donation into an opening in the replica. Mrs. Charlton, Secretary of the Adelaide Hoodless Home, told of the new renovations and explained that the interest of the Adelaide Hoodless Foundation Fund would be used for the upkeep of the Home.

The afternoon session was presided over by Mrs. Beatrice Noblitt. The guest speaker was Mrs. Jane Abramson, Chairman on the Council on Rural Development Canada (CRDC) Rural Women's Study Committee, and Professor of Social Work at the University of Victoria. Her theme was "Women in Rural Development." She reminded us that there wasn't an equal to our organization in North America. Mrs. Abramson said that society must redefine its concept of work and recognize the true value of women's unpaid labour if women are to improve their own lives and those of their families.

Mrs. Abramson had been the chairman of the rural women's study committee of the Council on Rural Development Canada, a 10-year-old federal advisory body whose funding was cut off last March 31. In her speech she said that the assumption that women's work is not really work with a dollar market value deprives women of a fair share in marital property, blocks their participation in the Canada Pension Plan, and probably also leads to an underestimation of the costs of producing farm products and the failure to return reasonable profits to farm enterprises.

The failure to recognize the economic value of unpaid labour indirectly helps exclude women from economic and political planning and decision making. It is quite generally held by both men and women that economic development is almost exclusively the domain of men. Mrs. Abramson went on to say that women tend to be the maintenance people of the rural community and economy, working long, unrecognized hours raising children, managing homes, running farms, and contributing to church and local groups, but not participating in community decision making.

Following our afternoon break we were addressed by Mrs. Sue Findlay, Vice-President of the Federal Advisory Council on the Status of Women. She had directed the women's programs for the Secretary of State which funded 2-1/2 million dollars in International Women's Year.

Mrs. Findlay commented on the study, released in January, "Rural Women: Their Work, Their Needs, and Their Role in Rural Development," which was the result of the two-year study by the CRDC. She assured the delegates that the recommendations in the study would be implemented now that the CRDC has been dissolved. Her address was much in agreement with Mrs. Abramson.

Mrs. Findlay said that Canadian women have developed a collective consciousness of the problems which confront them, and this consciousness allows us to turn to the systems, organizations, and policies that create and maintain our inequality — such as governments, unions, media, educational systems — and demand that we be integrated as full participants in Canadian society.

"By articulating the importance of the status of women not only for us but also for the quality of our communities," Mrs. Findlay concluded, "we can turn our experience of the past decade into permanent achievements for women."

Monday evening

That evening was "ACWW In Perspective — Canadian Priorities for Action." Ellen McLean, who was the Chairman, told the delegates that 1980 was the 50th Anniversary of ACWW. More than eight million women, circling the world — every race, every creed — working together for common aims. "Forward Together" is the theme for next year's ACWW. As so few people know about ACWW, Mrs. McLean told us that our challenge should be to become messengers and sell the story wherever we can. Look at ACWW in perspective.

Mrs. Irene Spry spoke about taking ACWW into Canada, Britain, India,

and Africa. ACWW is an extraordinary association, Mrs. Spry told the delegates, "It is the association of you and you and all of us." Other points: In the global village we must be good neighbours, and we must get to know our neighbours. The central office is the link which keeps all together. It is our duty to help families grow up to be good citizens. Togetherness can achieve results.

Mrs. Pearl Warren told of her visit to the North and stressed the need to give the ladies there friendship and encouragement.

Mrs. Joanna Miller of UNICEF was the next speaker. She had just returned from a UNICEF board meeting in Mexico and told us that UNICEF is in 101 countries, 137 supported countries, and is governed by 30 nations. She mentioned that women from developing countries know exactly what they need, and it is more than health, education, and food. They are frustrated, and it is time that the countries of the world fought for equality. Other highlights from her talk: As a result of International Year of the Child, a new consciousness of the needs of the child is evident. The target is that by the year 2000 all people should have primary health care. At present, 80 per cent of the children of the developing countries have no access to health care. The 10 provincial presidents then were asked what their provinces were doing for ACWW and to state our priorities. Mrs. McLean stressed UNESCO Gift Coupon 569 and Pennies for Friendship. The aim for the year is eight million pennies. An ACWW flag is being made by the women in Britain and this flag will visit all of Canada. We are asked to have a special ACWW Day and this money will be presented next year at ACWW in Hamburg, Germany. Pennies for Friendship were then collected and amounted to \$594.

Tuesday morning

The guest speaker was Dr. Terry Russell, Director of Youth Services, Regina Mental Health Clinic. Dr. Russell, a psychiatrist, spoke on the theme for our workshop to be held later in the day — "The future and our children." He had helped write the book, "Admittance Restricted" which deals with children being

restricted from the decisions made by the adult world and which is based on data taken from a survey which had been carried out previously. Highlights from his talk: We can cover the waterfront, the prairie, the rocks, but our children are our most important resources. Decisions are made without consulting with the child — he must be considered one of the family. Pay very special attention to children's needs and views. We all have means of communications, but do we use them? Our young people are in a state of depression, many are unemployed, suicides have increased by 41 per cent, north-western Ontario and northeastern Ontario have the highest rate in suicides in all Canada, four times as many males commit suicide as females, one third of all married couples end up in the divorce courts, teenagers account for one out of every thirteen pregnancies in Saskatchewan, one out of every nineteen deaths are accidental. The major health problem for our young people is stress. What do we do to help combat this?

International Year of the Child was basically set up to reflect upon the life of the child. We must concern ourselves about him. The child has the right of protection, especially in the courts. Often he is the one who suffers. In Israel, a child of 14 can ask to be free and look after his own rights. In France, the age is 18 while in Canada the age is 21. What is the status of the Canadian child? He is governed by provincial laws, not federal. Since biblical times, the father has had the sole control over the family. We should all have the right to contribute. Families are the place in which to grow up. The child's rights movement says that a child must attend school, but school must be appropriate to the child's needs. Child's rights are human rights.

It is our duty to see that the child is properly prepared to go out into the world to take his place. Our slogan should be: "Be kind to kids, be good to kids." Dr. Russell provided us with a great deal to think about, as did all the other speakers.

Tuesday Evening

Tuesday evening's program focused

on FWIC's Diamond Jubilee in the form of "A Sparkle from Each Province". By means of slides and skits each province depicted some information from their own area, varying from the history of the beginning of the Women's Institute, to its work in the past and the present, to interesting facts of the province.

The Past Presidents, "Greater than Diamonds", took the platform to reminisce briefly of their term in office. Those present were Dr. Nancy Adams, Mrs. Roylance, Mrs. Frances Clark, Mrs. Philip Matheson, Mrs. Marion Fulton and Dr. Ellen McLean.

At the close of the program a reception was held, when the 60th Anniversary Cake was cut.

Mrs. Walter Kilgour,
President,
Quebec Women's Institutes

Dear WI Members,

Thank you, thank you, thank you all for saving those tiny plastic clips off bread, buns, etc. For the last several weeks I have been receiving packets from all across the province. I thought I would get around to writing each one personally, but as the packages kept arriving I knew it would be Christmas before I got everyone answered. The WI page in the Journal is my answer to thanking each one of you. How many hundred pounds we have collected I cannot say — but I do know it has been several. We have been able to purchase wheelchairs, walkers and now are in the progress of getting a seeing eye dog — in fact by the time this goes to print we will have enough tabs collected to get the dog. The Brownies and Girl Guides are so thrilled to think that in this Year of the Child they are helping other children to have a better life and without the help of the WI members we would not have been able to have done so much.

Once more on behalf of all the Brownies and Guides and their Leaders in Brome Division we thank you.

Sincerely,
(Mrs.) Norma Sherrer
Missisquoi District Commissioner
Girl Guides of Canada
(Former Missisquoi County
WI Publicity Convener)



**Easy
drinking
O'Keefe.**

Would like to take this opportunity
to thank all those
who supported the
**PLOWING MATCH & FARM
MACHINERY DEMONSTRATION 1979**
at ST. HYACINTHE

and extends an early invitation
for the
**1980 CANADIAN NATIONAL AND
PROVINCIAL PLOWING MATCHES**
at

MACDONALD COLLEGE

Profite de cette occasion
pour remercier tous ceux
qui ont supporté le
CONCOURS DE LABOUR
et
**DÉMONSTRATION D'ÉQUIPEMENT
DE FERME 1979**
à ST-HYACINTHE

et vous invite pour les
**CONCOURS CANADIEN
NATIONAL ET PROVINCIAL 1980**
au

COLLÈGE MACDONALD

You too can contribute to energy conservation



Hydro-Québec's appeal to residential customers to stop wasting electricity has often met with the query as to whether schools, businesses, industry and farms are fully assuming their responsibilities in this regard.

This is why we attach so much importance to our energy conservation programs already under way or planned in public and private buildings, commercial and industrial centers, and municipalities throughout Québec.

These initiatives have already produced substantial savings and, what is more, are helping to promote better consumer habits. You too on the farm can contribute to this stand against electricity waste by selecting energy-efficient machines and equipment and by using electricity more sparingly. Thus you will pave the way towards a more stable energy future and a better quality of life for us all.

